

**CLAIMS**

We claim:

1. A method for optimizing communication in a network, the communication involving wanted and unwanted network messages wherein a set of filters are configured 10 to accept all wanted network messages and minimize the acceptance of unwanted messages in accordance with a selection criteria, the method comprising the steps of:

configuring a first filter to receive all wanted messages, the first filter comprising a defined bit and an undefined bit, each defined bit being either in a first state or in a second state;

15 setting a second filter equal to the first filter, the first filter and the second filter compose a first set of filters; and,

determining potential configurations of the first set of filters wherein each potential configuration of the first set of filters is capable of accepting all wanted network messages; and,

20 optimizing each potential configuration of the first set of filters.

2. The method of Claim 1 further comprising the step of:

selecting an optimum configuration of the first set of filters in response to a selection criteria, the optimum configuration of the first set of filters being selected from 25 the potential configurations of the first set of filters.

3. The method of Claim 1 wherein determining potential configurations of the first set of filters comprises the steps of:

setting an undefined bit of the first filter to the first state;

30 setting the corresponding undefined bit of the second filter to the second state; and,

continuing to set remaining undefined bits for the first and second filter until each undefined bit of the first filter and second filter have been correspondingly defined wherein a determined potential configuration of the first set of filters exists for each 35 initially undefined bit.

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4. The method of Claim 3 wherein optimizing each potential configuration of the first set of filters comprises the steps of:

filtering the wanted messages through each of the newly configured first and second filters of the first determined potential configuration,

10 grouping the wanted messages in response to being filtered wherein wanted messages accepted by the first filter are associated with the first filter and wanted messages accepted by the second filter are associated with the second filter;

configuring the first determined potential configuration of the first filter to accept all of the wanted messages associated with the first filter;

15 configuring the first determined potential configuration of the second filter to accept all of the wanted messages associated with the second filter; and,

continuing to optimize each potential configuration of the first set of filters in like manner until each potential configuration of the first set of filters has been optimized.

20 5. The method of Claim 1 further including the step of initializing the first filter with one of the wanted network messages.

6. The method of Claim 2 wherein the selection criteria includes minimizing the amount of unwanted messages passing through the first set of filters.

25 7. The method of Claim 6 wherein the selection criteria includes prioritizing the filtering to reject a specific unwanted message.

8. The method of Claim 2 further comprising the steps of:

30 providing a third filter for inclusion and cooperation with the selected optimum configuration of the first set of filters to facilitate communication and enhance filtering of the wanted messages throughout the network;

setting the third filter equal to the optimized first filter, the equivalent first and third filters, and second filter compose a second set of filters;

35 setting the third filter equal to the optimized second filter, the equivalent second

5 and third filters and the first filter compose a third set of filters;  
determining potential configurations of the second set of filters wherein each potential configuration of the second set of filters is capable of accepting all wanted network messages;  
determining potential configurations of the third set of filters wherein each 10 potential configuration of the third set of filters is capable of accepting all wanted network messages;  
optimizing each potential configuration of the second set of filters; and,  
optimizing each potential configuration of the third set of filters.

15 9. The method of Claim 8 further comprising the step of:  
selecting an optimum configuration among the second and third sets of filters in response to a selection criteria, the optimum configuration being selected from the potential configurations of the second and third sets of filters.

20 10. The method of Claim 8 wherein determining potential configurations of the second set of filters comprises the steps of:  
setting an undefined bit of the first filter of the second set of filters to the first state;  
setting the corresponding undefined bit of the third filter of the second set of 25 filters to the second state; and,  
continuing to set remaining undefined bits for the first and third filters of the second set of filters until each undefined bit of the first filter and third filter have been correspondingly defined wherein a determined potential configuration of the second set of filters exists for each initially undefined bit.

30 11. The method of Claim 10 wherein determining potential configurations of the third set of filters comprises the steps of:  
setting an undefined bit of the second filter of the third set of filters to the first state;  
35 setting the corresponding undefined bit of the third filter of the third set of filters

5 to the second state; and,

continuing to define remaining undefined bits for the second and third filters of the third set of filter until each undefined bit of the second filter and third filter have been correspondingly defined wherein a determined potential configuration of the third set of filters exists for each initially undefined bit.

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12. The method of Claim 11 wherein optimizing each potential configuration of the second set of filters comprises the steps of:

filtering the wanted messages through the second filter of the second set of filters and the newly configured first and third filters of the first determined potential configuration of the second set of filters,

15 grouping the wanted messages in response to being filtered wherein wanted messages accepted by the first filter of the second set of filters are associated with the first filter of the second set of filters, wanted messages accepted by the second filter of the second set of filters are associated with the second filter of the second set of filters, and wanted messages accepted by the third filter of the second set of filters are associated with the third filter of the second set of filters;

20 configuring the first determined potential configuration of the first filter to accept all of the wanted messages associated with the first filter;

25 configuring the first determined potential configuration of the second filter to accept all of the wanted messages associated with the second filter;

configuring the first determined potential configuration of the third filter to accept all of the wanted messages associated with the third filter; and,

continuing to optimize each potential configuration of the second set of filters until each potential configuration of the second set of filters has been optimized.

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13. The method of Claim 12 wherein optimizing each potential configuration of the third set of filters comprises the steps of:

filtering the wanted messages through the first filter of the third set of filters and the newly configured second and third filters of the first determined potential configuration of the third set of filters,

5 grouping the wanted messages in response to being filtered wherein wanted messages accepted by the first filter of the third set of filters are associated with the first filter of the third set of filters, wanted messages accepted by the second filter of the third set of filters are associated with the second filter of the third set of filters, and wanted messages accepted by the third filter of the third set of filters are associated with the third filter of the third set of filters;

10 configuring the first determined potential configuration of the first filter of the third set of filters to accept all of the wanted messages associated with the first filter of the third set of filters;

15 configuring the first determined potential configuration of the second filter of the third set of filters to accept all of the wanted messages associated with the second filter of the third set of filters;

20 continuing to optimize each potential configuration of the third set of filters until each potential configuration of the third set of filters has been optimized.

25 14. The method of Claim 9 wherein the selection criteria includes minimizing the amount of unwanted messages passing through the selected optimum configuration among the second and third sets of filters.

30 15. The method of Claim 14 wherein the selection criteria includes prioritizing the filtering to reject a specific unwanted message.

35 16. The method of Claim 2 further comprising the steps of:  
providing a third filter for inclusion and cooperation with each of the determined potential configurations of the first set of filters to facilitate communication and enhance filtering of the wanted messages throughout the network;

setting the third filter equal to the first filter of a first determined potential configuration of the first set of filters, the equivalent first and third filters, and second

5 filter compose a second set of filters;

setting the third filter equal to the second filter of the first determined potential configuration of the first set of filters, the equivalent second and third filters, and the first filter compose a third set of filters;

10 determining potential configurations of the second set of filters wherein each potential configuration of the second set of filters is capable of accepting all wanted network messages;

determining potential configurations of the third set of filters wherein each potential configuration of the third set of filters is capable of accepting all wanted network messages;

15 optimizing each potential configuration of the second set of filters; and,  
optimizing each potential configuration of the third set of filters.

17. The method of Claim 16 further comprising the step of:

20 selecting a filter configuration among the second and third sets of filters in response to a selection criteria, the filter configuration being selected from the potential configurations of the second and third sets of filters.

18. The method of Claim 16 wherein determining potential configurations of the second set of filters comprises the steps of:

25 setting an undefined bit of the first filter of the second set of filters to the first state;

setting the corresponding undefined bit of the third filter of the second set of filters to the second state; and,

30 continuing to set remaining undefined bits for the first and third filters of the second set of filters until each undefined bit of the first filter and third filter of the second set of filters has been correspondingly defined wherein a determined potential configuration of the second set of filters exists for each initially undefined bit.

35 19. The method of Claim 16 wherein determining potential configurations of the third set of filters comprises the steps of:

5 setting an undefined bit of the second filter of the third set of filters to the first state;

setting the corresponding undefined bit of the third filter of the third set of filters to the second state; and,

10 continuing to set remaining undefined bits for the second and third filters of the third set of filters until each undefined bit of the second filter and third filter have been correspondingly defined wherein a determined potential configuration of the third set of filters exists for each initially undefined bit.

15 20. The method of Claim 16 wherein optimizing each potential configuration of the second set of filters comprises the steps of:

filtering the wanted messages through the second filter and the newly configured first and third filters of the first determined potential configuration of the second set of filters,

20 grouping the wanted messages in response to being filtered wherein wanted messages accepted by the first filter of the second set of filters are associated with the first filter, wanted messages accepted by the second filter of the second set of filters are associated with the second filter, and wanted messages accepted by the third filter of the second set of filters are associated with the third filter;

25 configuring the first determined potential configuration of the first filter to accept all of the wanted messages associated with the first filter;

configuring the first determined potential configuration of the second filter to accept all of the wanted messages associated with the second filter;

configuring the first determined potential configuration of the third filter to accept all of the wanted messages associated with the third filter; and,

30 continuing to optimize each potential configuration of the second set of filters until each potential configuration of the second set of filters has been optimized.

21. The method of Claim 12 wherein optimizing each potential configuration of the third set of filters comprises the steps of:

35 filtering the wanted messages through the first filter and the newly configured

5 second and third filters of the first determined potential configuration of the third set of filters;

grouping the wanted messages in response to being filtered wherein wanted messages accepted by the first filter are associated with the first filter, wanted messages accepted by the second filter are associated with the second filter, and wanted messages accepted by the third filter are associated with the third filter;

10 configuring the first determined potential configuration of the first filter to accept all of the wanted messages associated with the first filter;

configuring the first determined potential configuration of the second filter to accept all of the wanted messages associated with the second filter;

15 configuring the first determined potential configuration of the third filter to accept all of the wanted messages associated with the third filter; and,

continuing to optimize each potential configuration of the third set of filters until each potential configuration of the third set of filters has been optimized.

20 22. The method of Claim 9 wherein the selection criteria includes minimizing the amount of unwanted messages passing through the selected optimum configuration among the second and third sets of filters.

25 23. The method of Claim 14 wherein the selection criteria includes prioritizing the filtering to reject a specific unwanted message.

30 24. A computer readable medium for optimizing communication in a network, the communication involving wanted and unwanted network messages wherein a set of filters are configured to accept all wanted network messages and minimize the acceptance of unwanted messages in accordance with a selection criteria, the computer readable medium comprising:

a first segment for configuring a first filter to receive all wanted messages, the first filter comprising a defined bit and an undefined bit, each defined bit being either in a first state or in a second state;

35 a second segment for setting a second filter equal to the first filter, the first filter

5 and the second filter compose a first set of filters; and,

a third segment for determining potential configurations of the first set of filters wherein each potential configuration of the first set of filters is capable of accepting all wanted network messages; and,

10 a fourth segment for optimizing each potential configuration of the first set of filters.

25. The computer readable medium of Claim 24 further comprising the step of:  
a fifth segment for selecting an optimum configuration of the first set of filters in response to a selection criteria, the optimum configuration of the first set of filters being selected from the potential configurations of the first set of filters.

20 26. The computer readable medium of Claim 24 wherein determining potential configurations of the first set of filters comprises the steps of:

20 a sixth segment for setting an undefined bit of the first filter to the first state;  
a seventh segment for setting the corresponding undefined bit of the second filter to the second state; and,  
an eighth segment for continuing to define remaining undefined bits for the first and second filter in like manner until each undefined bit of the first filter and second filter has been correspondingly defined wherein a determined potential configuration of the 25 first set of filters exists for each initially undefined bit.

27. The computer readable medium of Claim 24 wherein optimizing each potential configuration of the first set of filters comprises:

30 a ninth segment filtering the wanted messages through each of the newly configured first and second filters of the first determined potential configuration,  
a tenth segment for grouping the wanted messages in response to being filtered wherein wanted messages accepted by the first filter are associated with the first filter and wanted messages accepted by the second filter are associated with the second filter;  
an eleventh segment for configuring the first determined potential configuration 35 of the first filter to accept all of the wanted messages associated with the first filter;

5 a twelfth segment for configuring the first determined potential configuration of  
the second filter to accept all of the wanted messages associated with the second filter;  
and,

a thirteenth segment for optimizing each potential configuration of the first set of filters wherein the optimizing continues until each potential configuration of the first set of filters has been optimized.

28. The medium of Claim 24 wherein the selection criteria includes minimizing the amount of unwanted messages passing through the first set of filters.

15 29. The medium of Claim 26 wherein the selection criteria includes prioritizing  
the filtering to reject a specific unwanted message.